

REMARKS

This paper is being provided in response to the Office Action dated October 25, 2006, for the above-referenced application. In this response, Applicant has amended claims 1 and 24 to clarify that which Applicant considers to be the invention. Applicant respectfully submits that the amendments to the claims are fully supported by the originally-filed specification.

The objection claims 24-26 and 28 for informalities on being dependent from a cancelled claim have been addressed by amendments contained herein. Claim 24 has been amended to depend from pending claim 17. Accordingly, Applicants respectfully requests that the objection be reconsidered and withdrawn.

The rejection of claims 1-3, 7-10, 13-17, 19-21, 24-35 and 37-39 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,244,325 to Knohl (hereinafter "Knohl") in view of U.S. Patent No. 3,812,756 to Wenger (hereinafter "Wenger") and U.S. Patent No. 3,221,794 to Acres (hereinafter "Acres") is hereby traversed and reconsideration is respectfully requested.

Independent claim 1 recites a device that attaches a first component to a second component. A sleeve is positioned in the first component and is axially aligned in the first component. A bolt is positioned in the sleeve and has a threaded front end that projects outwardly from the sleeve for screwing into a mating thread of the second component, and which is disposed in the sleeve with a slight radial play and held supported against axial forces. The bolt has a recess in its axial section accommodated in the sleeve and a spring lock washer located in the recess, whereby as the bolt is axially introduced into the sleeve, the spring lock washer is

pressed radially by the sleeve into the recess and engages radially behind an inner shoulder of the sleeve for axial support. A rear end of the sleeve includes a lead-in cone and, at the rear end of the sleeve in the direction of introduction of the bolt, the sleeve includes a collar that projects radially outward. An end section at a front end of the sleeve has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the spring lock washer that co-acts with the lead-in cone during introduction of the bolt into the sleeve and co-acts with the inner shoulder of the sleeve during detachment. The sleeve includes a first interior section in the direction of introduction of the bolt and an adjoining second interior section, an inner diameter of the first interior section substantially coinciding with an outer diameter of the bolt, and an inner diameter of the second interior section being expanded relative to the inner diameter of the first interior section, wherein said inner shoulder of the sleeve is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve. Claims 2-4, 6-11 and 13-16 depend directly or indirectly on independent claim 1.

Independent claim 17 recites an attachment device. The device includes a substantially cylindrical sleeve having a hollow interior portion with a first interior section, an adjacent second interior section and an inner shoulder. An elongated bolt fits in the sleeve. A recess is formed on a portion of the bolt. An elastic member is disposed in the recess, wherein the elastic member radially compresses inwardly in response to the bolt being disposed in the first interior section. The elastic member radially decompresses outwardly to enable the elastic member to engage the

inner shoulder in response to the bolt being disposed in the second interior section. A rear end of the sleeve includes a lead-in cone and, at the rear end of the sleeve in the direction of introduction of the bolt, the sleeve includes a collar that projects radially outward. An end section at a front end of the sleeve has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the elastic member that co-acts with the lead-in cone during introduction of the bolt into the sleeve and co-acts with the inner shoulder of the sleeve during detachment. An inner diameter of the first interior section substantially coincides with an outer diameter of the bolt, and an inner diameter of the second interior section is expanded relative to the inner diameter of the first interior section, wherein said inner shoulder of the sleeve is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve. Claims 18-34 depend directly or indirectly on independent claim 17.

Independent claim 35 recites an attachment device. The device includes an elongated bolt and a means for accepting the elongated bolt. An elastic member is disposed on the bolt. A means for retaining the elastic member is formed on the bolt. A means for engaging the elastic member is included, wherein the elastic member radially compresses in response to the bolt being disposed in a first interior section of the means for accepting the bolt and wherein the elastic member decompresses and is engaged in response to the bolt being disposed in a second interior section of the means for accepting the bolt. A rear end of the means for accepting the elongated bolt includes a lead-in cone and, at the rear end of the means for accepting the

elongated bolt in the direction of introduction of the bolt, the means for accepting the elongated bolt includes a collar that projects radially outward. An end section at a front end of the means for accepting the elongated bolt has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the elastic member that co-acts with the lead-in cone during introduction of the bolt into the means for accepting the elongated bolt and co-acts with an inner shoulder of the means for accepting the elongated bolt during detachment. An inner diameter of the first interior section of the means for accepting the elongated bolt substantially coincides with an outer diameter of the bolt, and an inner diameter of the second interior section of the means for accepting the elongated bolt being expanded relative to the inner diameter of the first interior section, wherein said means for engaging the elastic member is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the means for accepting the elongated bolt. Claims 37-39 depend directly or indirectly on independent claim 35.

The Knohl reference discloses a fastener assembly with an axially slidable sleeve 36. The sleeve 36 is slidable axially through a limited range along the shank 40 of a threaded fastener 45. A resiliently yieldable retainer grips an unthreaded portion 46 of the fastener shank 40 and co-acts with the adjacent end of the thread 45 to captivate the sleeve 36 against slipping axially off of the fastener 45. (See, for example, Figs. 4-6 of Knohl.) As noted in the Office Action (middle, page 3), Knohl lacks disclosure that the bolt has a recess in its axial section

accommodated in the sleeve and a spring lock washer located in the sleeve, whereby as the bolt is axially introduced into the sleeve, the spring lock washer is pressed radially by the sleeve into the recess and engages radially behind an inner shoulder of the sleeve for axial support.

The Wenger reference discloses a positive lock self-retained fastener. As shown in Figure 5, a thread bolt 10 is provided with a nut 51 that is the primary holding means. A retaining ring 21 is disposed in a groove 20 and the outside diameter of the ring 21 is greater than the minor or root diameter of the threaded shank surface S'. Wenger does not appear to disclose a sleeve. (See, for example, Fig. 5 and col. 6, line 65 to col. 7, line 7 of Wenger.)

The Acres reference discloses a captive fastener including a screw 10 and shank 14 that is provided with a stepped groove 20. A split retaining ring 26 is placed on the screw 10. The screw 10 is turned so that threads 25 engage the threads in tapped hole 48. Acres does not appear to disclose a sleeve. (See, for example, Fig. 4 of Acres.)

Applicant respectfully submits that Knohl shows a sleeve positioned in the first component, a bolt positioned in the sleeve and having a threaded front end projecting outwardly from the sleeve, and a spring lock washer co-acting with an inner shoulder of the sleeve. As noted, Knohl lacks disclosure that the bolt has a recess for the spring lock washer separating the bolt in a first shank section a second shank section, wherein the axial length of the first shank section corresponds to the axial length of the first interior section of the sleeve. Therefore, the spring lock washer has the only function to retain the fastener bolt captively in the sleeve.

As noted above, Wenger does not teach a device having a sleeve. Therefore, a bolt cannot be fixed axially in the first component by a sleeve in order to be threaded with its front end into a second component. Since Wenger does not show a sleeve, Applicant submits that there is also no teaching in respect of the axial length of the bolt in relation to an axial length of a first interior section of a sleeve.

Acres shows a device with a bolt but, as noted above, also does not include a sleeve. The bolt is captively secured in a first member by a spring lock washer inserted in a recess of the bolt and co-acting with an inner shoulder of a bore and counter-bore of the first member. The axial length of the bore 36 with the smaller inner diameter is short in relation to the axial length of the first shank section of the bolt. Therefore, the bolt can be moved axially freely between positions shown in Figure 4 and Figure 5 of Acres. In the position of Figure 4 the threaded front end of the bolt projects out of the first member 34 in order to be screwed into a second member 46. In the other position shown in figure 5 the bolt is axially retracted into the bore 36 and 38, so that the threaded front end is fully enclosed in the counter-bore 38 of the first member.

Further, the Office Action cites to column 4, line 45 - 51, of Acres. In this part of Acres is described an application where the fastener is secured within the counter-bore 38 and extends upwardly through bore 36 for securing a member to the upper surface of first member 34. In this application the counter-bore 38 is relatively short in length, so that the fastener will at all times extend above first member 34. Attached hereto is a sketch drawing (Acres derived Figure) showing Acre's device as described in Acres column 4, lines 45 - 51 in connection with the further description in column 6, line 54 - 64. The fastener is supported axially in the first

member by the spring lock ring against the axial force of a nut threaded onto the upwardly extending end of the bolt. There is also in this application no sleeve fixing the bolt axially in the first member.

In contrast, Applicant submits that a distinguishing feature of the presently-claimed invention, as compared with all the cited prior art, is a sleeve axially fixed in the first component and the bolt axially fixed in the sleeve by the spring lock washer located in the recess in an axial position corresponding to the axial position of the inner shoulder of the sleeve because the axial length of the first interior section of the sleeve corresponds to the axial length of the first shank section of the bolt.

Attached hereto, for explanation purposes only in conjunction with this response, are sketch drawings illustrating an embodiment of the presently-claimed invention. In explanatory Figure A, a device is shown according to the claimed invention when the bolt is screwed into the second component in order to attach the first component to the second component. Explanatory Figure B shows the detachment by screwing the bolt out of the threaded hole of the second component. Since the bolt is axially held in the sleeve fixed in the first component, the second component is pressed away from the first component as the bolt is unscrewed out of the second component. So, not only are the first component and the second component not fixed together any longer, but rather, are separated actively from each other. None of the prior art citations show such an active separation of the two components only by screwing the bolt for detachment.

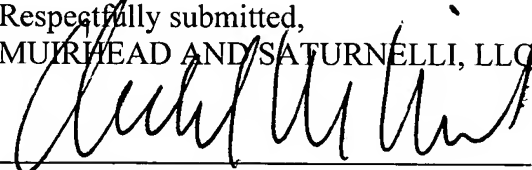
Figure A may be viewed in comparison to Figures 3 and 6 of Knohl as well as to Figure 4 of Acres. Figure B may be viewed in comparison to Figures 2 and 5 of Knohl as well as to Figure 5 of Acres. One can clearly see that according to Knohl and Acres the first component and the second component *remain in contact* when the bolt is turned out from the threaded hole of the second component. Whereas according to the presently-claimed invention the first component and the second component are *pressed away from each other* when unscrewing the bolt from the second component as a result of the recited features of the sleeve and bolt and their recited configurations with respect to the first and second components. The Wegner reference does not overcome the deficiencies of the Knohl and Acres references with respect to the presently-claimed invention.

Accordingly, Applicant respectfully submits that neither Knohl, Wenger nor Acres, taken alone or in any combination, teach or fairly suggest at least the features of a device that attaches a first component to a second component including: a sleeve axially fixed in the first component, and a bolt positioned in the sleeve, having a threaded front end that projects outwardly from the sleeve, and including a spring lock washer located in a recess in the bolt, whereby as the bolt is axially introduced into the sleeve, the spring lock washer is pressed radially by the sleeve into the recess and engages radially behind an inner shoulder of the sleeve, wherein the inner shoulder of the sleeve is formed by a transition from a first interior section of the sleeve to a second interior section, the bolt including a first shank section and a second shank section separated by the recess, and wherein an axial length of the first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve. In view of the above, Applicant respectfully request that the rejections be reconsidered and withdrawn.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8603.

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Muirhead and Saturnelli, LLC
200 Friberg Parkway, Suite 1001
Westborough, MA 01581
(508) 898-8601

Respectfully submitted,
MUIRHEAD AND SATURNELLI, LLC

Donald W. Muirhead
Registration No. 33,978

Customer No.: 26339